

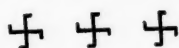
# RECORDS <sup>OF</sup> THE PAST

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PART VI

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## SACRED SPRINGS IN THE SOUTHWEST

**S**PRINGS are none too many in the southwestern United States, and for this reason they have been from ancient times prized as a most valued possession. The peoples who dwelt in this region saw in these sources of life-giving water the founts of continuance and well-being, and in confidence located near them their pueblos.

Save air, no elements of nature are nearer to human life than those combined into the primitive fluid which must always be within reach of the men who put themselves into the grasp of the desert. The primary knowledge of the tribes who were the pioneers, and of every human being that has since made his home in the great "American Desert" was complete as to the location, distribution, and idiosyncracies of water supply. No scientific survey could be fuller and more accurate except in the paper record, and no men save those who are at one with, almost part of, the environment, could develop the water sense to such a degree as did the Indians.

There is a story of a troop of Texas Rangers about to perish from thirst who gave their Indian guide the alternative of death or a reward, based on his failure or success in finding water within two hours, and the Indian earned the horse and gun by a display of desert craft that astonished the seasoned frontiersmen.

Since that band of Coronado's veterans pushed into the unknown country and stopped enchanted on the brink of the Grand Canyon,

travellers and explorers have marveled at the skill of the desert people and have caught an inkling of the way in which he reads the trail, the plants, the weather, and the "signs" that give a clue to the initiated.

By removing a stone which caps a secret spring whose location in such a spot seems improbable, or by pointing out a "seep spring" or tank among barren rocks, the Indian earns a regard and respect that has true sincerity from those who know the trials of parched lips and the suffering of thirsty animals.

Those who travel in the southwest move on a checkerboard where the plays are from water to water, and woe betide the man who makes an error. Much more was this important to large bodies of migrants who passed from one locality to another unceasingly during earlier times, traveling afoot, carrying children, food, and other burdens on their backs, and helping the aged on the toilsome journey. One may imagine the vast preparation necessary for a move on the part of the people in a pueblo, who may have been forced to migrate by perhaps many causes besides necessity, such as clan enmities, pressure of outside peoples, superstition, or the command of some powerful medicine man. For many days men have run to spy out the favorable locations in the region, hastening back to report.

When a choice is made, the able-bodied cache jars of water at points along the route and the transfer begins, not in most cases *en masse*, but by gradual infiltration of groups, and with many back and forward journeys to bring supplies. An unenforced migration may require several years before it is complete and the old pueblo, sacked and abandoned to the dead, gives place to a new pueblo laboriously built many miles from the former settlement.

In such manner the ancients traversed the solitudes of the desert land and brought to every spot where there was living water and a hope for subsistence the active life of the Pueblo housebuilders.

Thus, if one has a map of the springs and live streams, he would need no further information as to the distribution of pueblos, for water is the key.

Spring water is necessarily most prized, because it is drinkable and always at hand, while the watercourses, which, during the greater part of the year are sinuous reaches of dry sand, furnish at flood a quickly disappearing supply of thinned mud, distasteful to man and beast except in the distress of thirst.

The uniformity of religious belief and practice among the Pueblos is a striking fact, perfectly intelligible by reference to the compulsion of environment, which has had much to do with making this vast region a culture area. It is not to be inferred that the Indians of the southwest are peculiar in the worship of springs, since the sentiment is world wide, and has had a vast range in time, perpetuates itself in the folk lore of the highest civilizations, and presents in its manifestations a most interesting body of myth and fancy. In the Southwest, however, the arid environment has so intensified this feature of primitive culture



CANELBRA SPRING, ARIZONA

that no spring in the region is without evidence of many offerings to the deities of water.

It is small wonder, then, that the Pueblo Indians came to regard springs with special veneration; and that they wove around them myth and tradition, and made them objects of religious worship. To one acquainted with the environment and its radical needs this seems to have been a natural, even though unconscious generalization.

Perhaps offerings to springs will not admit of such simple explanation. Perhaps the mystery of the underground source of water welling up from unknown depths, impressive always even to the observer who believes himself free from the trammels of superstition, has also had a powerful effect on the imagination of the Indian, leading like many other natural phenomena to an attitude of worship of unseen powers behind these masks.

The religious philosophy of the Indian animates the natural world and furnishes beings of different ranks and occupations as moving forces that work for his benefit or harm. With these he is always striving to enter into communication and of the vast number of methods embodied in rituals, from the most complete to the simplest, the offering to the spring is one.

The feathered stick set in the edge of the water by the Hopi are messages to the gods of the underworld and the snakes employed

in the Snake Dance are set free at the springs to carry the petitions of the people to the gods. The miniature water vessels thrown into the springs may be petitions and reminders to the ruler of the waters of the world and the rain gods to pour out plentifully from their vessels upon the lands of the people.

Sacred Springs may therefore be regarded as altars, and the offerings as sacrifices, whose essence may be carried by the water in the same way as the fire offering is carried by the fire.

There are many kinds of these offerings, perhaps the most common being pottery vessels, at least objects of this character are generally the only ones which survive. In an ancient spring near the Hopi pueblos, numerous small pottery vessels of unusual forms were found; similarly from the ancient spring in Socorro Co., N. M., several hundred miniature vessels were taken recently. Stone beads are also very common in the sands of springs, and this form of offering was quite extensive. The writer observed in Lake Xochimilco in Mexico, a vast mass of offerings lying on the bottom of the "Ojos," or sources of the lake, which are two crater like depressions, perhaps 40 ft. deep. These consisted principally of pottery whole or in fragments.

There were also bones of animals, two horse skulls especially showing with distinctness in the limpid water. That the Plains Indians also venerated certain springs is shown by the remarkable series of chipped flint implements found in the Afton spring by Prof. W. H. Holmes.

It seems probable that a more complete knowledge of the beliefs in relation to springs among the different Pueblo Indians, will reveal an interesting chapter in the history of the dwellers of the semi-arid southwest.

Mrs. Stevenson says the Zuñi believe that there is a god who owns the springs of the six regions, from whom the shadow people or rain-makers beg water. These shadow people collect water in vases and gourd jugs from the six great waters of the world and distribute it through the clouds. The Zuñi also believes that the sacred springs are used for the gods to look through to the upper world, and the Spanish word *ojo* (eye), which is part of so many names of springs in the southwest, would corroborate this statement, and has probably the same significance.

Many of the decorations on modern Zuñi pottery are conventional representations of springs, ponds, lakes, and animals associated with springs.

The Hopi believe that the waters under the earth are controlled by a great plumed serpent, and that he has favorite springs for his appearances. Montezuma's Well, in northwestern Arizona, is said to be one of these.

The Tewa believe that a dragon-like aerial being floats about over the springs, and that to his presence is due the perpetuation of the water supply.

Among the Pueblos there is displayed a profound veneration for all natural phenomena, the sun as first cause, the sky, clouds, wind, rain, mist, hail, snow, ice and frost, the ocean, lakes, wells, springs, water holes, marshes, rivers, brooks and even mountains, as purveyors of water, having a share in Pueblo worship. The animals and plants whose habits and diffusion connected them with water were generally held in esteem, and were intimately woven into the texture of religious and symbolic art.

Some springs are more sacred than others; for instance, the one at each group of Hopi pueblos developed with great labor by digging out the earth around it, forming a pool walled up around the sides, and having steps leading down to the water, where certain cere-



KENALABAH SPRING, SHOWING FEATHERED PRAYER STICKS, ARIZONA

monies are performed. Though many examples of large walled springs have been found in connection with ancient pueblos, it remains to be seen whether or not this custom was general.

Springs of this character may have been improved by a single fraternity for the performance of a particular ceremony like that of the Flute society at Hopi. Still, the largest spring, its size giving evidence of the favor of the nature deities, was entitled to be the chief spring of the village, and as such was chosen for the center of remarkable rites.

It may be said in passing that one of the chief causes of friction between the Hopi and the agencies of the Government who sought



to better their condition was the profaning of the sacred springs by the location of school buildings, wash houses, etc., near them. The Hopi have now accepted the situation, and most of them, no doubt, see the practical value of the plan, but the benighted conservatives deeply disapprove of this evidence of progress.

It is not necessary that springs held in great esteem should be located near the present villages, they may be in fact 100 miles away, and the one delegated to bring "sacred water" from such a spring religiously makes the journey and returns with a tiny vase filled at the command of the priest who conducts the ceremonies. During a ceremony at a Hopi pueblo one may see toilworn men returning from quests to the sacred springs, bringing water, rushes, clay and other things required in the observances.

On one occasion the writer saw a party, then 70 miles from home, going to fetch water from a spring some dozen miles farther along the trail. This custom is an important clew to the location of the former seats of the clans that inhabit the present villages; because the old though ever vital traditions prescribe for ceremonies which are perpetuations of clan observances, water from springs at which their ancestors drank. Where the inquiry is made one may learn that near the springs visited to obtain water as prescribed were the old pueblos of certain clans.

It may be pointed out in this connection that the history myth of the Zuñi is in large measure a recounting of the springs at which they halted in their wanderings from the earth navel whence they issued, to the traditional center of the world where they now live.

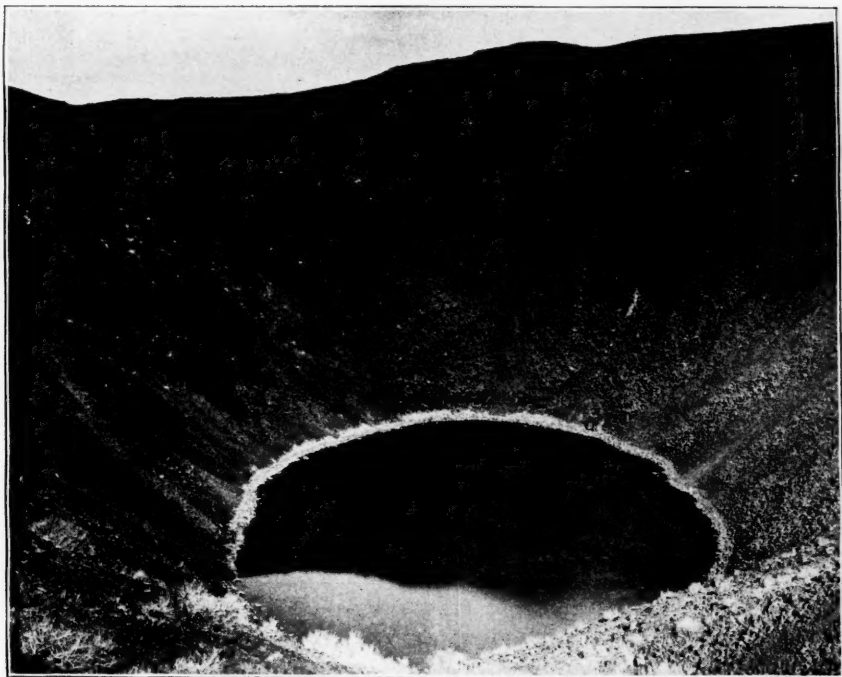
In reference to the care of springs, Dr. Fewkes says that the clearing out of sand drifts is one of the few instances of communal pueblo work performed by the Hopi. Notice of this event is given by the town crier at the direction of the chief and all the men of the pueblo aid with a will. When the Sun Spring was cleaned out in the autumn of 1898, the men of Walpi worked there for 3 days, and the women cooked food nearby; so that at the close of each day there was a feast.

While the work was going on a circle of the old men smoked native ceremonial tobacco in ancient pipes.<sup>1</sup> Among the Zuñi the cleaning of these sacred springs is also a ceremonial observance, and one spring, it is noted, is quite appropriately renovated by the frog clan.

There is evidence that on abandoning a pueblo the Indians "killed the spring," that is, covered it over and cunningly hid it from view. One such spring was accidentally discovered near San Mateo, New Mexico, by a horseman who noted that the ground at a certain spot gave way under his horse's feet. On digging, first a layer of long strips of cedar bark was uncovered, then a floor of pine logs, and so on for several feet, when a spring of clear running water was found.<sup>2</sup>

<sup>1</sup>*Tusayan migration Traditions*, 19th An. Bu. A. Eth. page 615.

<sup>2</sup>Bandelier. Final Report. Pap. Arch. Inst. II Cambridge. 1892 P. 308.



LAKE IN VOLCANIC CONE—THE HOME OF THE GODS OF WAR. A SACRED LAKE OF THE ZUNIS IN ARIZONA

Another, discovered 3 miles west of Chaves, N. M., on the Santa Fe railroad was choked with rubbish containing entire vessels of pottery, and the whole was covered with a layer of clay mixed with flint implements. In this spring was found a serpent fetish of wood.\*

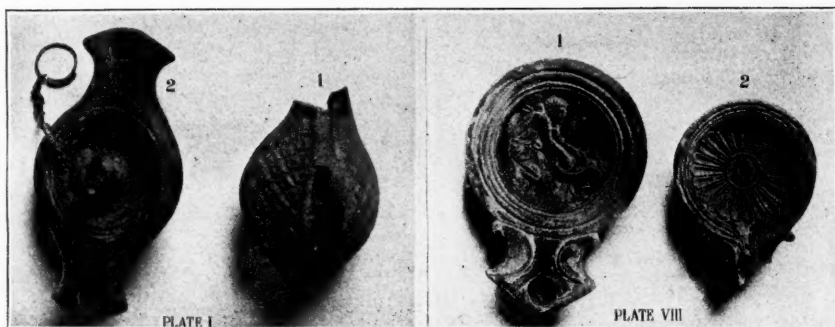
Other fetishes like this have been taken from a spring at Tule, Arizona, and Mangus spring on the Upper Gila, southwestern New Mexico. The association of the snake with water and the myth of the great serpent who lives in the underground water would seem to have been widespread and sufficient to account for the placing of these effigies in springs.

Near Zuñi, the engineers who are building a great dam to impound the waters of the Zuñi river cleaned out in 1904 an excellent spring, and in the debris found many ceremonial objects, which, unfortunately, were not preserved. This spring, which has an important place in Zuñi tradition, wells up through a deposit composed of the remains of pleistocene animals, and on the completion of the dam it will be submerged.

WALTER HOUGH.

*National Museum,*  
Washington, D. C.

\*Op. cit. P. 325.



### ROMAN TERRA-COTTA LAMPS\*

**O**F the many thousands of objects that crowd the museums of antiquities in the various cities of Europe, scarcely any are smaller than the terra-cotta lamps used by the ancients. However, from their artistic form and the innumerable subjects treated on them by way of ornamentation they are easily one of the most interesting of the objects made of clay.

While it is true that the Egyptians and Greeks used lamps,<sup>1</sup> yet there is evidence to show that they were not in general use among the Romans until about 300-250 B. C. Pliny<sup>2</sup> says that a lack of oil till about this time prevented their use. Martial makes a candelabrum say "candles (*candelae*) gave us our ancient names. The oil lamp was not known to our thrifty forefathers."<sup>3</sup> Before their introduction, candles (*candelae*) made of wax and tallow; torches (*taedae* or *faces*), bits of pine wood or a sort of metal cornucopia filled with flax, or tow, and covered with resin, oil, pitch, or wax, were used for illuminating purposes.<sup>4</sup>

The candelabra commonly mentioned in literature were supports merely, originally for candles, afterwards for lamps. These were made of wood, bronze or precious metals and consisted of the foot, shaft, and plinth or tray. These have been found in large numbers at Pompeii and other sites.

Two terms were applied to lamps by the Romans, *LYCHNUS*, from the Greek *λύχνος* and *LUCERNA*, derived, according to Varro,<sup>1</sup>

\*Read, with stereopticon illustrations, at the Classical Conference at Ann Arbor, Michigan, March 29, 1906, by Professor Edward W. Clark, of Ripon College. The illustrations are from originals, part in the writer's possession and part in a collection belonging to Ripon College.

1. The invention of lamps is first referred to the Egyptians, who declared that Vulcan made them, Minerva supplied the oil, and Prometheus lit them. No Egyptian terra-cotta lamps are, however, found earlier than the Roman period. They are first mentioned by Pherékrate's the Athenian poet of the time of Alexander the Great.—Birch.

2. Pliny, N. H., XV, 1.

3. Martial, XIV, 43.

4. Appul., Met., IV.



from "lux." Ennius, Lucretius and Vergil<sup>2</sup> seem always to have preferred the Greek terms to the Latin. In form these lamps were usually boat-shaped receptacles more or less large to contain oil, with one or more beaks or nozzles. The parts were 4:

1. The reservoir-infundibulum.
2. The circular top, discus, with rim, margo, sometimes ornamented.
3. The nozzle with a hole for the wick, called variously—rostrum,<sup>3</sup> nasus, and myxus (μύξα).
4. The handle, a part not always found, called ansa or manubrium.

In the DISCUS was a small round hole through which oil was poured. This hole, in the case of bronze lamps, was often covered with a stopper, in the case of terra-cotta lamps this was seldom true.

The number of nozzles varied, and lamps were named accordingly—*monomyxus* with one; *dimyxus* or *bilychnis* with two; *trimyxus* with three; or *polymyxus* with more. As many as 30 nozzles have been found on a single lamp. Martial has a *lucerna polymyxus* say, "Tho' I light up whole feasts with my flame and have so many nozzles (*myxæ*) I am called one lamp."<sup>4</sup>

Lamps for carrying were commonly provided with a ring handle, while those without a handle were intended to be stood on a candelabrum, or other support. Besides these others were provided with chains of bronze and hung from the arms of candelabra, from a hook, or from the ceiling. (See Plate I.)

Such a hanging lamp was called *Lucerna Pensilis*. One lamp in my possession (Plate II, fig. 2) was evidently designed to be hung from a nail.

The oil was vegetable, usually olive, though mineral oils are also mentioned,<sup>5</sup> and the wick was made of tow or from the pith of various kinds of reeds and rushes. The wick was called *ellyphnia*<sup>6</sup> (ἐλλύχνια.) The rushes from which it was made were the *scirpus*,<sup>7</sup> the *lychnitis* or *thryallis*,<sup>8</sup> *verbascum*,<sup>9</sup> *papyrus*.<sup>10</sup> Tow<sup>11</sup> was also used, and even sulphur.<sup>12</sup>

Lamps were made of gold, silver, bronze, and bronze encrusted with gold, glass, lead (found on the Esquiline Hill in Rome<sup>13</sup>), stone (in the form of a house with columns and Ionic capitals), alabaster, amber, and clay.

It is my purpose in this paper to speak only of Roman terra-cotta lamps, exclusive of the Christian type.

1. Varro, L. L., V., 119.

2. Verg. Aen., I, 726.

3. Pliny, N. H.; XXVIII, 163.

4. Martial, XIV, 41.

5. Pliny, N. H., XXXV, 15-51-179; XXIII, 4-41.

6. Pliny, XXIII, 4-41-84; XXVIII, 11-47-168; Vitruv., 8-1; Stat. S., 4-9-29.

7. Pliny, N. H., XVI, 178.

8. Pliny, N. H., XXV, 121.

9. Pliny, N. H., XXV, 10-73; XXVI, 4-11-23.

10. Pliny, N. H., XXVIII, 168.

11. Pliny, N. H., XIX, 17.

12. Pliny, N. H., XXXV, 175.

13. Scavi, 1891, pp. 299-302.

In answer to the question as to where these lamps have been found we must say first everywhere. For on almost every site where the excavator's spade has been thrust, they have been found. Yet that there were centers of manufacture is certain. With the exception of North Africa, where there was probably a factory, the chief sites were in Italy, namely, in Rome and vicinity; Campania; Cisalpine Gaul, especially at Mutina. Besides, there were doubtless many local factories, but they were small, poor, and but little known.

#### USES OF LAMPS

They were used to illuminate private houses, public buildings, streets and the forum on occasions of rejoicing, as offerings in temples, and in tombs.

1. Private houses. While the plan and construction of the Roman house admitted the largest possible amount of daylight into the chief living rooms, yet there were many portions that were almost deprived of all outside light. Here lamps were placed on brackets (a marble relief of a room containing a Roman mill, on a sarcophagus in the Vatican, shows a lamp supported in such a way), or suspended by chains or hung on a nail. Sometimes a terra-cotta support was made to which the lamps were fastened, such as an altar, with one, two or three lamps projecting from the side. Martial and other writers speak of lamps for the sleeping room,<sup>1</sup> the dining room, baths, etc.

2. That public buildings, such as theaters, and thermæ, and public places, such as streets and the forum were lighted at times of special rejoicing we know from many passages in Latin authors.

Domitian illuminated the amphitheatre<sup>2</sup> for hunts and gladiatorial contests; Caligula gave theatrical performances at night, and lighted up the "whole city."<sup>3</sup> Alexander Severus used lamps in the public baths.<sup>4</sup> Juvenal<sup>5</sup> speaks of the use of lamps at the front doors of houses on festal days. Tertullian<sup>6</sup> refers to their use at the time of political victories. Julius Cæsar's triumphal procession to the Capitol was lighted by 40 elephants bearing lights;<sup>7</sup> Cleopatra used them in great numbers fastened to branches of trees at the time of her evening reception given in honor of Anthony;<sup>8</sup> while a fragment of Lucilius<sup>9</sup> speaks of the forum being thus lighted.

3. Temples. Lamps were used in temples both for illumination, and as votives in Greece and in Italy. Such votives have been found in Selinus, Sicily,<sup>10</sup> while a very elaborate lighting scheme for the temple of Apollo on the Palatine Hill is described by Pliny.<sup>11</sup>

4. Tombs. As in the temples so in tombs they served a double purpose. At the entrance they were used to furnish light and within

1. Martial, X, 38-7; XIV, 39. Moretum, 10.

2. Suet. Dom., 4.

3. Suet. Cal. 18; Tac. Ann., 14-21.

4. Lamprid. Vit., 24.

5. Juvenal, XII, 92.

6. Apol., 35.

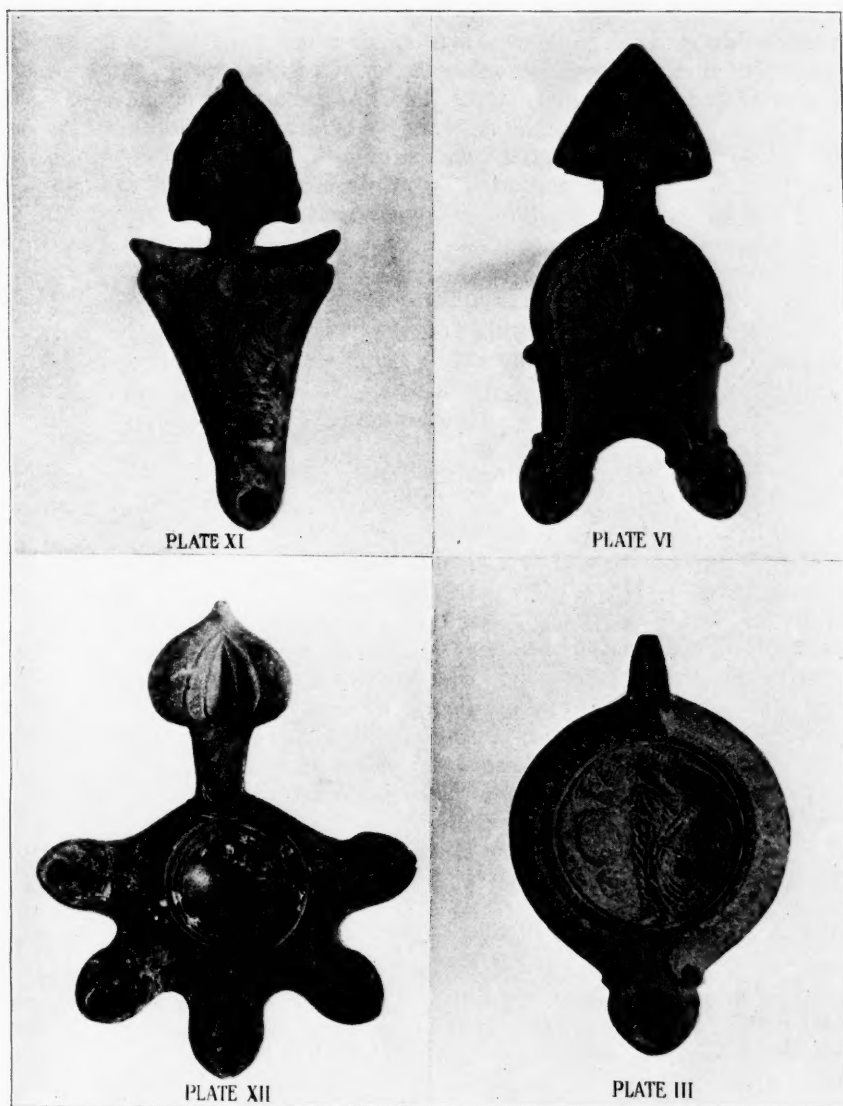
7. Suet., Caes., 37.

8. Plut. Ant., 26.

9. Lucil., Sat., III, 23.

10. Scavi, 1894 p. 205.

11. Pliny, N. H., XXXIV, 3, 8.



for votives. Large numbers have been found in tombs, and seem to have been put there for the same reason that vases and other such articles were. They were a part of the tomb furniture, were often supplied with oil, and were in some cases lighted at stated intervals. A tomb inscription in the British Museum directs the heirs of the dead one to place a lighted lamp in his tomb on the Kalends, Nones, and Ides of each month, and in another case, the heirs are directed to put oil in the lamp on the deceased's birthday anniversaries.\* An inscription

\*Walters, *History of Anc. Pottery*, Vol. II, p. 397.

from Salerno reads, "Whoever shall place a burning lamp in this tomb, may golden earth cover his ashes."<sup>1</sup> Still another inscription orders that a lamp be offered daily to the *manes* of the dead at public expense.<sup>2</sup> Petronius tells of the maid servant replenishing the oil in a lamp placed in a tomb as often as was required.<sup>3</sup> All of these passages seem to look toward a perpetual light in the tombs, and so another inscription reads, "may the lamp always burn."<sup>4</sup>

Besides these uses, a few special ones may be noted. An approaching storm was foretold from the way a lamp burned. We read in Vergil, "Nor were even the maids, carding their nightly tasks, ignorant of the approaching storm; when they saw the oil sputter on the heated lamp, and foul fungous clots grow thick."<sup>5</sup> The word I have translated lamp is *testa*, properly a sherd. Children also were named, according to Chrysostom, by giving names to lamps which were then lighted and allowed to burn out. The last to go out gave its name to the child.<sup>6</sup> On a few lamps the figure of a bear has been found with the word "fear" in Greek. These may have been designed, when placed in tombs, to keep away any ravishers of the tomb.

Still another use of lamps, of a good deal of interest, is that of *strenæ*, or New Year's gifts. On the Kalends of January, beginning with the year 153 B. C., gifts were exchanged which consisted, in general, of sweetmeats of honey, figs, dates, sometimes gilded, money, —especially the bronze ass with the double head of Janus—branches of bay and palms.<sup>7</sup> Congratulatory expressions and good wishes were also at that time exchanged.<sup>8</sup> The origin of this custom was the worship of the Sabine goddess Strenia, who corresponds to the Roman Salus. Strenia was the goddess who presided over New Year's gifts and had a shrine in Rome—*summa sacra via*.<sup>9</sup> Near by was a grove sacred to her, from which were carried sacred branches in her honor to the Arx on the first day of each year. Augustus received *strenæ* on the Capitol, and realized from them a sum so large that he built shrines to certain deities. We know that Caligula condescended to take such gifts and to receive the *stipes*, and in such quantities that his new year's presents must have been not only of good omen but of great value. "He proclaimed that he, too, at the beginning of the year," says Suetonius, "would receive new year's gifts (*strenæ*) and stood in the vestibules of the temples on the Kalends of January to receive the coins (*stipes*) which a crowd of all classes showered before him from their hands and laps."<sup>10</sup> Tiberius<sup>11</sup> forbade the exchange of gifts, though the custom was renewed after his death.

Lamps, decorated with a motto and with minute representations of the usual gifts, the ass, cakes, wreaths, etc., were thus given on Jan.

1. As yet, however, I find no Latin author who mentions these among

1. C. I. L., X, 633.

2. C. I. L., II, 2,102.

3. Pet. Sat., III, 77.

4. C. I. L., VI, 30102.

5. Verg. Georg., I, 390.

6. Homil. in Ep. ad Cor., I, 12.

7. Ovid, Fasti I, 185-190, Martial, VIII, 33,

11.

8. Ovid, Fasti, I, 175.

9. Varro, L. L., V, 47.

10. Suet., Calig., 42.

11. Suet., Tib., 34.

other gifts, though from the figures upon them and from the inscriptions such as "may the new year be prosperous for you," there can be no doubt that they were thus exchanged. (See plate III.) Further reference to the inscriptions on these lamps will be made later under the heading of inscriptions and trade marks upon lamps. (See page 181.)

#### TYPES OF LAMPS

We come now to the types of lamps. How to classify them has been a puzzle for some time. A sort of classification according to handles can be made, but that is not satisfactory, for the handle is not an essential part. The figures upon the lamps or their shapes are not a good basis for classification, and so an attempt has been made to group them according to their nozzles, not the length of the nozzle, as that varies with the size of the lamp, but according to its form. Fink of Munich devised this method, and Walters in his *History of Ancient Pottery* has followed him. I find myself entirely in accord with Fink's methods, and shall illustrate the types he makes from photographs made from specimens in my possession. One change I wish to make, however, and that is to add a fifth type to his four. As I believe that it is earlier in time than his class I, in order that references can be more easily made to his article I shall call this first class A, and then number the others 1 to 4, as Fink does.

TYPE A. This is the oldest type, and dates from 300-200 B. C. They are known as the Esquiline lamps, as they have been largely found on that hill. Dressel<sup>1</sup> says that they were made on a wheel not in a mould. They have usually a black, or at any rate a dark varnish. They very probably were imported from Campania. They have no ornaments or factory marks, with two exceptions,<sup>2</sup> but often have graffiti on the sides such as—"Noli me tangere," "Ne attigas," "Pone fur." A development from these rude lamps is shown in Plate IV. One of these is known as the Delphini-form (Plate IV, fig. 2) from a fin-like projection on the side. They have a square nozzle small ring handle, with simple or no decorations. The Delphini-form have usually a large number of globules on the top or a band of ivy leaves. They have been found in large numbers in North Africa, and were probably exported into Italy as far as to the middle of the peninsula. Their date is the I century B. C. (See also the one designed to hang on a nail, which has a similar nozzle—though much later, and is perhaps a Christian lamp representing rudely, in its shape, a fish. Plate II, fig. 2.)

TYPE I. These belong to the I century B. C. to the time of Augustus, have rounded nozzles, with volutes on both sides. They are with or without handles, generally of one nozzle, though some have two, and are decorated with a great variety of subjects. The handles, when found, are usually rings over which projects a triangular

<sup>1</sup> C. I. L., XV, part II.





PLATE V

or crescent-shaped part which easily lends itself to decoration. This decoration is very frequently an acanthus leaf or a palm-ette with sometimes two dolphins or two chickens picking up grain at the base. The crescent handles sometimes are adorned with a figure of Jove, and again the handle part, at times, has an abnormal development, as an arcade within which sits or stands a figure of Jove or other deity. (See plates V, VI, VII).

New Year's lamps belong to this type having a round nozzle and double volutes. They date from the time of Augustus to Caligula, as is known from the inscriptions. They are examples of the best form of lamps. (See plate III).

TYPE II. These have a pointed nozzle with volutes. The shape of the nozzle is ill-adapted to more than one on the same lamp, they are usually without handles, but are figured. They may be earlier than Type I, certainly not much later. (See plate VIII).

TYPE III. These are characterized by a grooved nozzle, which is somewhat elongated, without volutes, always made of

red brick-clay, unglazed, without handles, with an inscription on the under side in raised letters, and either without ornamentation or with masks of Pan on the discus.

These are of the I century of the Empire, beginning with the reign of Augustus. This is known for some have been found together with coins of M. Agrippa and Augustus,<sup>2</sup> and because they were in use in Pompeii at the time of its destruction in A. D. 79.<sup>3</sup> They are the most practical type of all, having a sunken discus with good rim around, and in nearly every case with a groove running to the hole in the nozzle. By this means any overflow of oil was kept from spilling or from soiling the hands. On the edges of the discus are always to be found 2 or 3 projecting knobs, which Dressel<sup>4</sup> thinks were for the attachment of chains for hanging. I cannot agree with this idea, as I have never been able to find a lamp whose knobs were perforated, and besides, when there are but two projections they are so placed that the lamp does not balance. It is more probable that they are bits of clay left protruding from the lower part of the lamp which were inserted in corresponding holes in the discus. This then was

1. C. I. L., XV, Nos. 6631, a and b.  
2. C. I. L., XV, part 2.

3. Scavi, 1881, p. 300.  
4. C. I. L., XV, part 2.

pinched over by the thumb and finger and formed, when baked, a fastening. This type is found in the northern part of Italy and Cisalpine Gaul, rarely south of Rome, and the center of manufacture may have been in Mutina. These are often spoken of as the "Fortis" lamps, because that signature is common. Another signature, "Pastor," rarely found, is shown in Plate IX, fig. 2.

TYPE IV. These have a plain, round or heart-shaped nozzle, without volutes, projecting very little from the body of the lamp. They are generally with ring handles and inscriptions, often with



PLATE VII

an ivy pattern around the margin, and a figure on the discus. This type has been found in large numbers in Greek soil, and frequently in that case without handles. It is a rather late type, dating from the II century A. D. (See Plate X).

Besides these 5 classes, terra-cotta lamps often assumed fanciful forms, such as the human head or foot, masks, oxheads,<sup>1</sup> helmets, birds, dogs, horses, a camel reclining, elephant, tiger, rat, snail-shell, boat, etc.

1. See Plate XI.

2. Belonging to Latin Dept. Ripon College.

A fragment in the shape of a pigeon<sup>2</sup> shows that the tail was the handle, while a lamp was on either wing. The feathers are carefully worked out in the clay and were colored; traces of pink being still clearly seen. Boat-shaped lamps are somewhat common, having as high as 10 to 12 wick holes on each side. A very interesting lamp of this type is described by Walters,<sup>1</sup> and is to be seen in the British museum. He says, "It is not only in the shape of a boat, but is decorated with subjects referring to the pseudo-Egyptian cults characteristic of Rome in the late Republican and early imperial period. This lamp, which is no less than 20 in. long, and has numerous holes for wicks along the sides, was dredged up from the sea at Pozzuoli, where it may have originally been in the temple of Isis and Serapis."

Rectangular shaped lamps are less common than the round, but are found. Some, to be seen in the Museo Kircheriano at Rome, show a row of nozzles in a straight line as though one could buy lamps by the foot. These fanciful shapes are of late manufacture, dating, according to Birch, down to Constantine.

As we have said, the great majority of lamps had but one wick, and the light must have been rather feeble. Even when there were several wicks<sup>2</sup> the illumination could not have been brilliant. The necessity for many lamps is then apparent. That the odor and smoke from these might be very annoying is evident, and probably frequent attention had to be given to keep them trimmed. The reservoirs were never large, rarely measuring over 3 in. or 4 in. in diameter and 1 in. high. The oil would have to be replenished often, which could be easily poured in by the use of a *guttus* or small terra-cotta pitcher designed for this purpose. Juvenal speaks of the number of lamps at a school, the odor and the smoke, in a familiar passage in his seventh satire. He is speaking of the school-master, and says, "Lose not your whole reward for having smelt as many lamps as there were boys standing round you; while Horace was altogether discolored, and the foul smut clave to the well-thumbed Maro."<sup>3</sup> To avoid the odor of the oil, perfumes were sometimes used.<sup>4</sup> To prevent smoking the wicks would have to be snuffed and occasionally drawn out. In the case of bronze lamps we know that trimmers and sharp needles were used, for they have often been found. Some such device must have been used in the case of terra-cotta lamps also. Many of these, especially in types I and II, show a small hole through the clay just back of the nozzle. It has been suggested that this is where the needle was stuck when not in use. The supposition is not reasonable. In the first place, the holes are generally mere slits, often partly closed in the process of baking. Then, too, they are too near the flame. They would soon become hot and black with the smoke. Another theory that a small bit of wood was placed here to keep the upper and lower halves of the lamp apart before it was baked is more tenable.

1. *History of Anc. Pottery*, Vol. II, p. 403

2. See Plate XII.

3. Juvenal, *Sat.*, VII, 1. 225.

4. Martial, X, 38-39.

The clay from which lamps were made was usually red, though it was sometimes brownish or even yellow, depending upon the locality. Some are coated with a slip, and so belong to the lustrous pottery. As we have seen the early ones often had a coating of black varnish. An inscription which refers to the cost of a lamp may also, perhaps, refer to the quality of the clay. This reads, "*Emite lucernas colatas ab asse*," and may mean "buy well made lamps for an ass," as Marshall interprets COLATAS to refer to the quality of the material.

As has been said, the earliest undecorated types, found on the Esquiline, were made on the wheel. The decorated lamps had to be made differently. Some were made by hand, but probably nearly all in a mould. Such moulds have been found, and consisted of two parts—one for the body of the lamp and one for the top. The handle was probably added as a separate piece later. Probably the two parts were adjusted by mortices and tenons, as we have seen in type III, (Plate IX), though one frequently finds lamps which clearly show a lack of careful adjustment. (Plate II, fig. 3; plate X). A pattern lamp was made, and from this a mould was modelled out of finer and harder clay.<sup>2</sup> Such moulds have been found made of both terra-cotta and plaster. Into the mould the prepared clay was pressed by the fingers, the decorative figure made by a stamp, perhaps as the Arretine vases, while fancy borders of ivy, meander pattern, etc., may have been made by a wheel. Signatures in relief were made in the mould, while others were cut with a stylus before the lamp was baked. Important manufactories must have had a large number of moulds as foundries have to-day. More than 90 different stamps have been found with one name, L. CAECILIUS SAEVUS, 84 with the name C. OPPIUS RESTITUTUS, and so on. Doubtless moulds were exchanged, as we find the same pattern inscribed with different names.

After the two pieces were joined the parts were pressed together and the joints pared with a tool. These marks are often easily seen, and fragments show the roughness of the joints within. The hole for filling is usually carefully cut, as is also that for the wick. Baking was done by means of a slow fire in a kiln, where the lamps were set closely together. A mass of unbaked lamps, which had fallen together because of some accident, is shown in the Athens museum.

#### SUBJECTS REPRESENTED ON LAMPS

The number of subjects represented on lamps is enormous. It will be my purpose here only to mention general classes of subjects with very little attempt at detail. Walters<sup>3</sup> gives an extensive list of subjects found upon lamps in the British museum alone, which covers 12 pages.

1. C. I. L., VIII, 10478 (1).

2. See Daremberg & Saglio Vol. III, p. 1334. *Walters-Hist. of Anc. Pottery*, Vol. II, p. 405.

3. *Hist. of Anc. Pottery*, Vol. II, pp. 406 ff.

While sometimes excellent art is displayed, showing a real Greek spirit, still in general we have here a more every-day art, appealing to the common people; for doubtless makers selected subjects that would sell best. Very much as it is with the vases, we have many scenes of public and private life, and a great deal can be learned of these functions as well as of mythology and religion. As the earliest types come mainly from southern Italy, so in these we find the best work, and as we have already seen in class III the later types were less decorated.

We may make perhaps 7 or 8 general classes of subjects.

1. Gods. Both the Olympic deities and lesser ones. Jupiter, Juno, Apollo, Diana, Mercury, Minerva, Mars, Venus, Amor, Ceres, Neptune, Amphitrite, Tritons, and Nereids. Scylla, Pluto, Proserpine, Cereus, Bacchus, Satyrs, Silenus, Maenads. Aesculapius, Hygeia, Pan, and Echo. Castor and Pollux, Hercules, Bellerophon, Perseus, Centaurs, Amazons, etc. Then we find another kind of deities, such as Fortuna, Victoria, Roma, Luna, Ganymede, Cybele, Attys, Marsyas, the Sun. The Genius of Rome and of Augustus. Serapis, Isis, Anubis, Harpocrates.

2. Heroes and Heroic Legends. Labors of Hercules, of Theseus, and of Perseus. Judgment of Paris, Death of Hector, Achilles and the Body of Hector, Flight of Aeneas, Ulysses and the Sirens, Ulysses and Circe, Ulysses and Polyphemus, Palladium stolen by Ulysses and Diomedes, Sphinx and Oedipus, Leda and the Swan, Europa and the Bull, Endymion.

3. Historical and Literary subjects. An exceedingly interesting one of this class is Diogenes in the tub (*pithos*). A few busts of emperors and empresses are found. Romulus and Remus, Aesop's fables, such as the fox and the crow, etc.

4. Scenes from the circus, theater, and amphitheater. Gladiators in all positions, Beast fights, Races of bigas and quadrigas. One of these in the British museum shows the spina, metae, vehicles, carceres, and seats for the spectators in a circus with a race of four-horse chariots. Actors, masks, hunting scenes, boat races, a soldier saluting an officer who is passing by on a horse, etc., etc.

5. There are numerous scenes erotic and obscene.

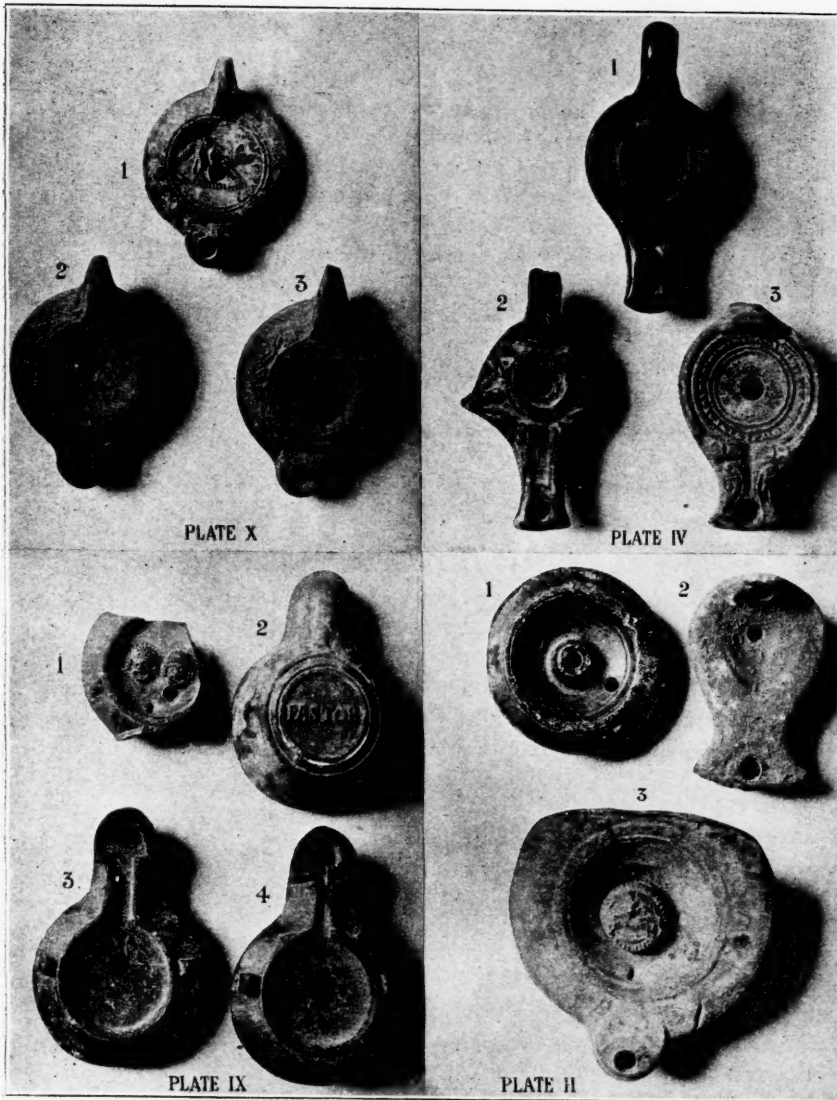
6. Animals, of all kinds, including four-footed wild and domestic beasts, birds, sea animals, and fish.

7. Inanimate objects. Vases, amphora, canthara, baskets of fruit, cornucopia, torches, plants, palms, etc.

8. Many are decorated simply with geometric patterns, circles, etc. Others with floral designs.<sup>1</sup> Some interesting subjects are shown in the illustrations to this article of lamps belonging to the writer or to the Latin Department of Ripon College. The wolf, cock, gladiator, masks, cornucopia are common. (Plates XIII; X fig. 1; VII fig. 4). The representation of a follower of Ulysses tied under a sheep (plate

1. See Daremburg & Saglio, Vol. III, *Lucernae*.





VII, fig. 3), and the slave grinding with a hand mill (plate VIII, fig. 1) are quite uncommon. Plate VII, fig 2, shows a cupid by a fallen lion, which reclines on a couch with a high back. Plate V shows an unusually fine Medusa head, while the different geometric patterns are excellent. Plate II, fig. 3 shows a cover over the filling hole representing very crudely a theatrical mask. Lamps with terra-cotta covers still intact are very rare. Plate IV, fig. 1 undoubtedly had a cover very possibly of metal.

## INSCRIPTIONS AND POTTERS' MARKS

Very many Roman lamps have inscriptions on them, either in raised letters or cut with a stylus on the bottom, the edge, or on the discus. Potters' signatures are always underneath, and the number of them is very large. Much less often we find inscriptions on the upper parts. These may be mentioned under 4 heads:

1. Words addressed by the lamp.
2. That which tells why or when the lamp was made.
3. Names of the figure.
4. Makers' names and trade marks.

1. Words addressed by the lamp. These are the expressions found on the Esquiline lamps referred to on page 175. Besides those already given we may add:

*Non sum tua; Sotae sum, noli me tangere; Speri sum; N (e) Atiga (s) me, Gernuci sum.*

Besides, we have such expressions as these—*Ave et vale*, hail and farewell; *Qui fecerit vivat et q (ui) emerit*—May he who made me and he who buys me prosper.

*Bono q (ui) emerit*—May he prosper who buys me.

2. Inscriptions which tell why and when lamps were made. Here we have those alluded to on pages 175 and 176, which are known as New Year's lamps. A figure of victory holds in her left hand a palm, and in her right a little shield, on which is inscribed these inscriptions:—*ANNUM NOUM FAUSTUM FELICEM MIH HIC*.<sup>1</sup> May the new year be prosperous and happy to me here.

*OB CIVES SER (vatos)*—For the preservation of the citizens (plate III).

*FIDES PUBLICA*—The public trust.

*LUCER (na) PU (b) LICA*—probably indicates that this lamp was especially made for some public function.

The inscriptions *SAECULI*, *SAECULO*, *SAECULARES*,<sup>2</sup> may possibly refer to the *Ludi Sæculares*, but may be similar in meaning to the inscription *SAEC (ulum) AU (reum) DOM (ini)*, The Golden Age of our Lord, which is found on a lamp from Antium.<sup>3</sup>

On others are *PALLAS VICTRIX*; *ARTEMIS EPHESIORUM*: these are votive lamps, and were deposited in temples.<sup>4</sup>

3. Names descriptive of the subject. Names of gladiators—*SABINUS*; *POPILLIUS*. Other subjects—*GANYMEDE*;<sup>5</sup> *DIOGENES*;<sup>6</sup> *AEN (eas)*, *AN (chises)*, *ASC (anius)*;<sup>7</sup> *TITYRUS*.<sup>8</sup>

4. Potters' signatures and trade marks. These consist of names of makers, almost always in an abbreviated form, with sometimes a

1. C. I. L., XV, 6196 a.

2. C. I. L., XV, 6221.

3. C. I. L., X, 8053, 4.

Walters, *Hist. of Anc. Pottery*, Vol. II, p. 421.

4. See page 172.

5. C. I. L., XV, 6239.

6. C. I. L., XV, 6238.

7. C. I. L., XV, 6236.

8. C. I. L., XV, 6240.

special mark, upon the bottom of the lamp. The letters were usually cut in the soft clay by a stylus, though sometimes they were raised or made by a stamp or by the mould. The oldest signatures are found on the Esquiline lamps, but the large majority come on those of the empire.

A "Delphini-form" in the Musée Alaoui has a monogram of A and H.<sup>1</sup> Figure 4 of Plate I has a rosette on the underside. Figure 3, Plate IV, has an inscription MELLA scratched on the bottom, a form I have been unable to find either in the Corpus or in any other list. A single-letter may be used either above or below the name of the "*offinator*" or master workman. Again, these trade marks are sometimes symbols. On a "Fortis" lamp is found a wreath and palm branch beneath the name. On another with the name L. CAE SAR. and on one with the name C. IUN. BIT. are found two circles thus ○, one above and one below the inscription.

Other lamps have no names beneath, but simply marks; an ivy leaf, a branch, a human foot, a trident, or simply one letter, as L, I, H and many more are found.

Perhaps these marks were used to distinguish different series made in the same factory. In a similar way we find a lamp with the word PULCHER on the bottom near the nozzle, while in the center is the name L. FABRIC. MASC. Dressel interprets this as meaning that PULCHER was a workman in the shop of L. Fabricius Masculus. This last inscription is an illustration of what was nearly always true, that signatures were abbreviated. The full form would be "*Ex Officina*" with the name in the genitive case. So one lamp<sup>2</sup> reads EX OF AIACIS, that is, EX OFFICINA AIACIS.

In lamps from the middle of the II century to the age of Augustus names are written in the nominative or genitive case and only with a praenomen and gentile name, as, A. CORNELI; P. MUNATIUS. Sometimes only gentile names, as, AIMILI; or only a cognomen, as ANTEROS. Very rarely we find the word "*fecit*" or the abbreviation "*f*" with the nominative.<sup>3</sup>

In the period represented by type III nearly all signatures are cognomina and probably all in the genitive case, as, COMMUNIS; FORTIS; ATIMATI; STROBILI; very rarely PASTOR. Birch<sup>4</sup> gives all of these as slave names.

In type IV we find either one (cognomen), two (nomen and cognomen), or three names. Examples are, C. IUN. BIT.; C. CLO. SUC.; C. OPPI. RES. Again names of women occur, as we know potteries were often owned by women. The abbreviations also vary in the form of the praenomen or cognomen, as we find both C. OPPI. RES. and L. OPPI. RES.; C. IUN. BIT. and C. IUN. ALEXIS or DRACO, etc.

1. Walters, Vol. II, p. 423.

2. C. I. L., XV, 6282.

3. C. I. L., XV, 6250.

4. Birch, *Hist. of Anc. Pottery*.

The variations may indicate different members of the same family who in turn had charge of the factory.

The following list, taken from Walters' work,<sup>1</sup> is perhaps full enough for our present purpose, tho' many more names are easily obtainable.<sup>2</sup>

- Annius Serapiodorus (ANNI SER): Rome, Ostia.  
 C. Atilius Vestalis (C. ATIL. VEST.): Rome, Italy, Gaul, Britain.  
 Atimetus: Italy, Gallia Narbonensis, Pannonia.  
 L. Cæcilius Sævus (L. CÆ. SÆ.): Rome, Southern Italy, Sicily, Sardinia, Gallia Narbonensis, Britain.  
 Clodius Heliodorus (CLO. HEL): Italy, Africa, Spain, Gaul.  
 C. Clodius Successus (C. CLO. SUC.): Rome, Gaul, Sardinia, Africa.  
 Communis: Rome, Pompeii, Gallia Cisalpina, Pannonia.  
 Crescens: Gaul, Pannonia.  
 L. Fabricius Masculus (L. FABR. MASC.): Rome, Gallia Cisalpina, Africa.  
 Florentius (FLORENT): Rome, Italy, Sicily, Tunis, Gaul, Germany, Britain.  
 Fortis: Rome, Italy, Sicily, Dalmatia, Germany, Gaul, Britain.  
 Gabinia: Italy, Sardinia, Africa, Gaul.  
 L. Hospidius Crispus (L. HOS. CRI.): Gaul.  
 C. Julius Nicephorus (C. IULI. NICEP): Italy, Gaul.  
 C. Junius Alexis: Rome, Campania, Sicily, Sardinia, Africa.  
 C. Junius Bito: Italy, Sicily, Gaul.  
 C. Junius Draco: Rome, Italy, Sicily, Sardinia, Africa, Gallia Narbonensis.  
 L. Mar. Mi.: Rome, Campania, Sicily, Spain, Gallia Cisalpina.  
 L. Munatius (with various cognomina): Rome, Africa.  
 N. Nævius Luc (N. NÆV. LUC.): Italy, Sardinia, Spain, Gaul.  
 M. Novius Justus (M. NOV. IUST): Rome, Naples, Sicily, Sardinia, Africa, Gallia Narbonensis.  
 C. Oppius Restitutus (C. OPPI. RES): Rome, Italy, Sicily, Sardinia, Africa, Gallia Narbonensis, Cyprus.  
 Passenus Augurinus (PAS. AUG.): Italy, Gaul.  
 Strobilus: Rome, Italy, Africa, Pannonia, Dalmatia, Gaul, Britain.  
 Vibianus: Gaul, Pannonia.  
 C. Viciri Agathopus (C. VICIRI AGAT.): Italy, Sardinia, Gallia Cisalpina.

An examination of the list shows the geographical distribution of lamps. It will be noted that nearly all are found in Rome, while seldom is the same name found in the North and South of the empire. For example, the "Fortis" lamps, as has been said, were perhaps made in Mutina and they are not found at all in Africa and generally only in the northern part of Italy and in Gaul. On the other hand, those with the name Oppius Restitutus are rarely found in Gaul.

Some Roman lamps have Greek inscriptions, or signatures, but in general these come from the south of Italy and from Sicily and Cyprus. Dressel calls attention to the fact that nothing can be determined from the form of the letters. The old form of L, is used in the time of the empire, and this should be noted as a caution.

In conclusion. Mention has been made before of the article of Herr Fink in the *Muenchener Sitzungsberichte*. Constant use has been

1. *Hist. of Anc. Pottery*, Vol. II, pp. 425-426.

2. See also Daremberg & Saglio, art. *Lucerna* and Fink in *Sitzungsb. d. Muench. Akad.* 1900, pp. 689, 692 ff.

made in this paper of his study of Roman lamps in the Munich museum and mention must now be made, in a brief summing up, of his researches in an attempt to ascertain the chronological order and the geographical distribution of the various types and also to answer in a satisfactory way the question as to why it is that the same stamps do not appear in different classes.<sup>1</sup>

The statements that follow are true for the museums at Munich, Berlin, and London (including the British museum, Guildhall and South Kensington).

Classes I, II, and IV are rich in decorations, while III has none or a mask of Pan.

Classes I and II are found often without inscriptions, while III and IV almost always have one. Class IV shows the greatest number of different inscriptions and class III the next largest number. Stamps of one class do not encroach on other classes. We find these exceptions:

FLORENT is in classes III and IV.

C. IUN. DRAC. is in classes I and IV.

C. OPPI. RES. is in classes II and IV.

To illustrate these points<sup>2</sup>:

In class I only, we find P. CESSIUS FELIX and L. MUNATIUS SUCCESSUS; in class II only, L. FABRICIUS MASCULUS; in class III only, ATIMETUS, FORTIS, PHOETASPUS and other single cognomina; in class IV, CLODIUS HELVIDIUS, C. JUNIUS BITUS, L. MUNATIUS THREPTUS, and C. CORNELIUS URSUS. Another interesting thing Fink notes is that certain signatures, such as L. CAECILIUS SAEVUS, BASSUS, Cerialis, SEXTUS EGNATIUS APRILIS and ROMANENSIS are not confined to one type of lamp, but in these cases it is to be noted that each type shows a variation in the signature, thus in class I, L. CAEC. SAE; in II, L. CAE. SAE; in III, L. CA. SAE; while in IV, L. CAE. SAE. occurs 141 times.

So we get SEX. EG. APR.; EG. APRILIS; EN. APRILIS and EN. APRILIS. As was said before (page 183), this may indicate work from the same factory, but at different periods and under different management, for example, father and son.

A study of the ornamentations seems to give these conclusions.

In class I Greek art is evidently preferred. Greek spirit is seen in the form, and in the choice of the subject. Representations of gods, myths, and scenes from comedies are numerous.

Class II Herr Fink thinks may be derived from I, but this seems uncertain. The subjects are Roman, not Greek, such as gladiators, battles, hunting scenes, etc.

1. Fink, p. 685 ff. Walters also makes a summary of Fink's conclusions in Vol. II, pp. 428-429.

2. These examples are taken from Walters' *History of Ancient Pottery*, Vol. II, p. 428, who in this way sums up Fink's statements.



In classes I and II we find references only to paganism, therefore they do not reach to the time of Christ. Examples of both classes III and IV show the Christian monogram and figures of the Good Shepherd carrying a lamb on His shoulders.

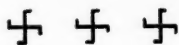
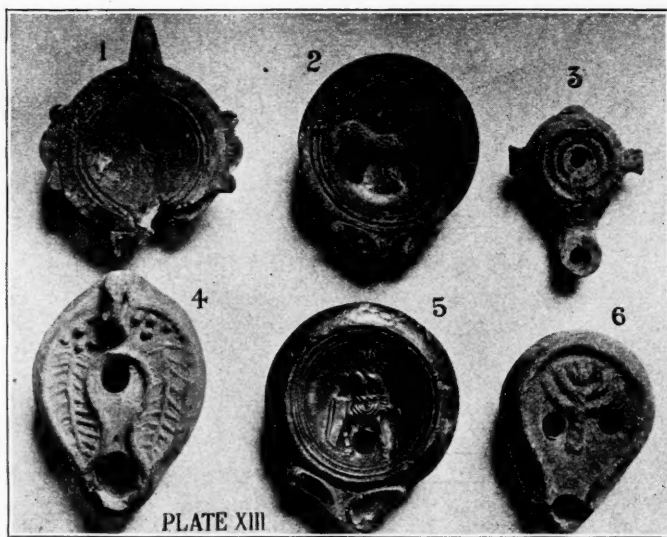
Fink also illustrates a type which seems to be a sort of connecting link between types III and IV. In this we find the small round nozzle of type IV, but also a channel from the nozzle to the interior, like type III. It seems to be an attempt to combine the good qualities of III with those of IV.

Evidence which comes from Regensburg shows that class III falls in the empire from the reign of Augustus to that of Hadrian, and, as we have noted, its use was largely confined to districts north of the Apennines.

Type IV is essentially Italian, but is found in the northern part of Italy and in Gaul. It comes within the Christian era.

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**MUMMY FROM CHILI:**—An interesting mummy has been reported as found in the Antonio copper mine, Sierra Atahualpa, Chili. That the man was killed while at work seems evident from the two stone hammers found near him. The copper oxide of the mine embalmed him. An age of 2,000 years has been assigned it by some.

## ARCHÆOLOGICAL REMAINS IN A PREHISTORIC CHALK QUARRY IN SWEDEN

**A**T a meeting of the Anthropological Society at Stockholm, held on March 16, Dr. Olaf Holst gave an exceedingly interesting account of his discovery of a prehistoric mining industry at Tullstorp, in the vicinity of Malmo, province of Skane, southern Sweden. At this place there is a mass of chalk 3 miles long, 1000 feet wide and 100 or more feet in depth, which proves to be a glacial boulder, since it has glacial deposits both above and below it. This vast mass has been moved from some place in the bed of the Baltic Sea and transported many miles in a body, constituting probably the largest glacial boulder of which we have any knowledge. For many years several large companies have been engaged in quarrying this chalk for commercial purposes. At repeated intervals the workmen have produced the horns of deer and elk, which they said were found in the chalk. But so improbable were these stories that everybody disregarded them until the investigations of Dr. Holst, made in connection with his geological survey of the region. The mystery is now solved in a most interesting way and it turns out that prehistoric man had at a very early time learned the value of the flint nodules embosomed in the chalk, and had sunk numerous vertical shafts in it and excavated caverns to obtain the flint for the purpose of making stone implements. Subsequently these abandoned shafts became filled with earth, chalk and other material.

Upon close study of these shafts by Dr. Holst, it was found that "they consisted of old flint mines 2 to 5 meters deep, which, during the Stone age, or perhaps during even a later prehistoric time, had been inhabited by people who dug into the chalk mass in order to get down to the flint boulders imbedded at varying depths.

"It is to be noted that when the flint is taken out of the chalk in a moist condition it is more easily worked than when dry. That the aborigines of Skanes knew this can be inferred from the piles of rubbish found around the shafts, which show that the rough work on the flint was commenced immediately after it was taken out. It was evident that much of the rubbish had been thrown into the bottom of the shafts. Here were found implements for digging made of deer and elk horn.

"Dr. Holst further said that he had also examined in a preliminary way what appear to be large dwelling-places found in the immediate neighborhood of the mines. Here, among the numerous interesting remains, were found bones of cattle, hogs, and dogs; also chips, which give evidence that these dwelling-spots were inhabited by people during the Bronze or perhaps earlier Stone age.

"Some flat-cut slabs of sandstone, it was declared by Professor Montelius in a discussion that followed, have been, to all appear-

ances, used on the Island of Gottland in a training park to this day. Professor Montelius also spoke of the great interest this discovery by Dr. Holst had awakened, because now, for the first time, flint mines had been discovered in Sweden which in all essentials correspond to previous discoveries made in England and Belgium."



### THE PALESTINE EXPLORATION FUND

**F**OR many years the late General Sir Charles Wilson studied the problem of the true site of the Holy Sepulchre, laying aside all prejudice and using the calm temper of the scientific man. So careful was he always to look impartially at all sides of a question that his own opinion was not easy to learn, but in a field where passionate assertion has prevailed, he very properly avoided all partizanship and was ever careful to uphold the standard of pure scholarship.

His studies on "Golgotha and the Holy Sepulchre" have been issued in a volume of 200 pages, edited by Sir Charles Watson. The whole question is studied most thoroughly. The meaning of the name Golgotha, the usual place of execution, Jerusalem topography at the time of the crucifixion, the Bible narrative, the position of other places named, the arguments for traditional sites, the attitude of early Christians, identifications in the time of Constantine, theories as to the tomb, the walls of Jerusalem,—these are the subjects of his chapters. Then 8 appendices deal with the views of early and late authors. The book is fully illustrated.

While the book will add greatly to the reader's general information, it is so cautious in its conclusions that it will not be likely to change the preconceived views of anyone. But it will certainly tend to cause broader and calmer consideration of a difficult problem and will so serve an important use. It is interesting to see how fairly General Gordon's emotional views are treated by one so wholly different in form of mind, and we are shown Gordon's fanciful drawing of a human skeleton, with the head at the skull hill, the base of the backbone at the temple site, and the foot at the Pool of Siloam. Gordon's mind was as enthusiastic as a crusader's and as devoid of rational science, and the so-called "Tomb of Christ" pointed out by him and afterwards bought by his friends at a great price, will not bear the test of Chronology.

THEODORE F. WRIGHT.

## EDITORIAL NOTES

INCORPORATION OF THE ARCHAEOLOGICAL INSTITUTE OF AMERICA:—On May 21 the House of Representatives passed a bill, sent to them by the Senate, incorporating the Archæological Institute of America as a national society.

A WINGED HEAD FROM ARMENIA.—The *London Sphere* prints in the issue of May 5 a picture of a metal figure recovered from an Armenian excavation. It is a human head with wings, bearing a striking resemblance to the Egyptian winged disc.

ANCIENT CIVILIZATION IN THE SAHARA:—Judging from the results of the excavations of the great tombs in the Sahara, M. E. F. Gautier concludes that a Neolithic Soudanese civilization extended over the Sahara, almost to the boundaries of Algeria. Relics of the Berber invasion are superimposed upon these traces of this early civilization.

AGE OF THE RHODESIAN RUINS:—Since our May issue there has come to our notice a more recent estimate of the age of these ruins. Mr. Randall MacIver has made investigations which lead him to assign to them a much later date than had been done previously. At Dhlo-Dhlo he cut a trench below the cement floor of a hut, which was intact, and, among other objects, found fragments of Nankin china. Experts fix the date when Nankin china was manufactured and imported as the XVI century A. D. These facts have convinced Mr. MacIver that the Rhodesian ruins date from mediæval or post-mediæval times, and were built by an African race much like the modern natives.

ANCIENT JEWELS IN BELGIUM:—In 1880 some jewels of barbarian origin were found in French tombs uncovered in southern Belgium, near Chimay.

These have been given to the Royal Museum at Brussels. This collection consists of 6 pieces. First, a bronze ring, ornamented with a gem. The stone has, carved in a hollow, a fantastic animal, which seems to be seizing the end of its tail. This design is common in rings found in many places. Next, two ornamental bronze buttons from a scabbard, each bearing, in a hollow, a picture representing, at first sight, a tree-like plant. But it may possibly be identified with a degenerate form of the twisted serpent ornamentation of Scandinavian origin. Then there is a bronze bracelet, open, and much thicker at the

ends than in the middle. The ends are ornamented with carvings. Last is a pair of ear-rings, made of bronze wire, each with a pendant of the same material.

INDIAN TRADITIONS OF VOLCANIC ACTION IN MEXICO:—According to Indian traditions collected by Padre Hunt-Cortez many of the so-called extinct volcanoes of Mexico have been active within the Christian Era. In the year "*cetecpatl*" or "one flint" which corresponds to the year 76 A. D., Ajusco and Xictli were in full eruption, belching forth fire and overwhelming towns with seas of lava. These same badly behaved mountains, standing between this Valley [of Mexico] and the Valley of Morelos, where lies, on its promontory, Cuernavaca, were again in eruption in the year 1114. Ajusco and Xictli are supposed to be extinct." But can we be certain of this, since once, after a period of quietude covering 1038 years, they became active?

Popocatepetl (*popoca*, to smoke, and *tepetl*, mountain) is still hot below the surface. In the 28th year of the founding of the city of Mexico, then called Tenochtitlan, the city was much injured by severe seismic disturbances and showers of ashes from the volcano. This was in the year "*nahui calli*," "four houses," or, as we know it, 1354. A year later, Cerro Partido or Split Hill began to be active, and its summit was riven asunder.

About 30 years before the Conquistadores arrived, that is in 1489, Ixtaccihuatl, the White Woman, made trouble. Earthquakes, considered as being caused by this mountain, meteorological phenomena and horrible phantoms presaging evils were observed, and were later considered as foretelling the Conquest.

"Xico, a sunken volcano in the bed of Lake Chalco, broke into full eruption in the year 1170 and vast columns of black smoke rose to the heavens, darkening the valley."

NEW EVIDENCE OF HUMAN REMAINS IN THE AURIFEROUS GRAVELS OF OREGON:—In addition to the evidence already gathered in regard to the early presence of man on the Pacific coast, we are glad to note Mr. J. F. Kemp's report\* of mortars and pestles found near Waldo, Josephine County, Oregon.

This town is "situated on the stage line from Grants Pass on the Southern Pacific Railroad, 100 miles south of west to Crescent City on the coast and is 40 miles from Grants Pass."

The gravels at Waldo were early worked for the ore, and it was discovered to be rich in the precious metals as far back as 1853, when the gravels were worked "in the bed of a small stream which heads up in the ancient gravels of what must once have been a large river." The old gravels are now on top of a ridge, and have thus remained, while the former banks have been removed by erosion. "The bed-



rock, as exposed in the placer mines, is chiefly serpentine, but in one place the rim-rock is fossiliferous sandstone, which has been studied and determined by J. S. Diller." The boulders are eruptive. In the gravels, pestles appear often enough to cause no surprise. We give the following instances, however, as being specially interesting:—

During the night shift two miners, H. M. Pfefferly and D. W. Yarbrough, found two mortars and one or two pestles, which they carefully laid aside, and in the morning brought them to Mr. W. J. Wimer, the manager and part owner of the mine. This gentleman carefully recorded the facts as presented by the men and added his own statement. The question was asked if they were found in such a position as would warrant the supposition that they might have reached the point by the caving in of the gravels above.

"It was found in 1902 firmly embedded in a blue cement gravel (the pay channel) 58 ft. from the surface. They had to resort to picks to get it out and the bed or hole out of which they pulled it remained, showing its perfect mould." In the morning "it was still packed tightly to its very rim with blue cement gravel. With a sharp pick I carefully picked the gravel loose, so that I could clean it." After washing "the detritus, I got 8 pretty large colors of gold." "The mortar is about 12 in. high by 9 in. across, and is made of the hardest granite"

"The other mortar is what Colonel Draper terms a quartz mortar, having a saucer-like cavity on its top." "This mortar was probably about 10 ft. under the surface," and "300 yards from the other," although found in 1901. "The pestles were discovered with it; they were in pay dirt."

IMPORTANT DISCOVERIES BY DR. PETRIE:—The Egyptian Research Account, the new English Egyptological Society of which I wrote in RECORDS OF THE PAST last November, has made important historical and interesting archæological discoveries in the Delta under the personal direction of Professor W. M. F. Petrie, who now devotes his time entirely to the work of this Society. His object is actual discovery *in situ* and not clearing of sites and copying of inscriptions, however useful that line of archæological work may be. Dr. Petrie writes to me of "our discovery of the actual town and temple site of Onias. It is (he says) a very clear case of all the known requirements being satisfied, as to date, place, conditions and building."

The city of Onias, it will be remembered, was a Jewish settlement in Egypt, named after the high-priest of that name, who took refuge in Egypt from the tumults in Jerusalem and the profanation of the temple and of the worship held in it. He erected "the Temple of Onias" in the city, which became famous as a shrine where the

(\*Science, March 16, 1906.)

Jews might witness the religious observances of the orthodox faith and ritual. "The Mound of the Jews," or *Tel-el-Yehudiyeh*, as the Arabs call it, was inspected by Linant in 1825, and Prof. Hayter Lewis described the mounds in a paper read before the Society of Biblical Archaeology (Vol. VII, part 2). Greville Chester explored the mounds and brought away some relics now in the British Museum. In 1870 Brugsch-Bey did some excavation work at one of the mounds and secured various objects of interest for the museum in Cairo. In 1887 Dr. Naville endeavored to settle the problem of the site and temple, but, however interesting his efforts, as described by him in the Egypt Exploration Fund memoir (No. VII), he truly remarks: "I cut through the mud platform on which the alabaster pavement had stood, in hope that I should reach earlier constructions, but without any result. It was the same with several attempts made in other parts of the mound; they brought no monuments to light." Nor did he find any remains of the Hyksos period or any traces of the warlike XVIII dynasty. "It is possible that the site may go as far back as the XII dynasty," Naville adds.

Dr. Petrie's letter to me goes on to say: "We have a remarkable historical subject here in clearing the Hyksos cemetery and the great fort of the Hyksos. The tombs contain scarabs of the Hyksos age, and we have got at this place scarabs of Khyam, Apepi II and of Skhanra, 3 foreign kings who were probably all Hyksos. There can be no doubt of the importance of this place under the Shepherd kings. Now on examining the great fortification of the town I find that it is curved and irregular in outline, unlike the Egyptian plan; and it was an immense earthwork with a sloping face, and no gateway, but a long sloping causeway leading up over the earth bank. Evidently the builders did not know of brick or stone work, all their fighting was with bow and arrow, and they could not build a gateway. But about a generation or two later they remodeled all their fortifications and put an immense stone wall about their earthwork, having learned such defence from the Egyptians. This agrees exactly with what we might expect to find done by the Hyksos. We have at last touched their work, and learn that they were archers who used great earth defences, like the Turkomans in modern times."

Professor Petrie describes other important discoveries, but I forbear to quote him, as he hopes to send RECORDS OF THE PAST an account of Onias with illustrations later on. I add, however, one absorbingly interesting item: "One inscription makes it very probable that this (*Tell-el-Retabeh*) was the city Ramases. (*Exodus* i: 11), and the position leaves no other site possible for that city." Naville delighted more than the archaeological world, when, in 1883, he identified Pithom, and if Petrie has located the site of the other city built by the Israelites in bondage, he will receive the appreciative thanks of tens of thousands of Jews and Christians.

WILLIAM COPLEY WINSLOW.

